

The Changing Landscape of Sport Facilities

Consequences for Practitioners and the Environment

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Introduction

Knowledge about the relationship between sport and environmental sustainability has grown stronger in recent years (McCullough & Kellison, 2018; Wilson & Millington, 2020). For example, in discussions about the construction of golf courses and the staging of global sports events such as the FIFA World Cup and the Olympic Games, environmental perspectives have been rhetorically highlighted but not sufficiently implemented in practice (see, e.g., Del Fiacco & Orr, 2019; Millington & Wilson, 2016). One area that has only started to be investigated is how *artificial* sports facilities, in the form of artificial ski tracks, artificial turf surfaces, artificial rapids, ice hockey arenas, indoor ski slopes, and indoor surfing facilities, influence people's relationship to environmental sustainability. Studies within this area primarily deal with how the *actual construction* of, for example, a stadium affects the environment (see, e.g., Salome et al., 2013; van Bottenburg & Salome, 2010). We know far less about how an active presence in these artificial facilities influences sporting practitioners' thoughts about the environmental impact of their own practice in their sport.

In this chapter, therefore, we aim to critically discuss environmental issues connected to sports facilities in a general sense and more specifically in relation to *artificial* sports and outdoor facilities. In doing this, we will use several theoretical models and concepts (Engström et al., 2018; Millington & Wilson, 2016; Sandell, 2016) to discuss the current research with examples taken from the illustrative artificial landscapes of cross-country skiing, canoe slalom, and turf-based sports. What makes artificial sports facilities especially interesting from the perspective of environmental sustainability is the ambiguity they involve. On one hand, the actual constructions (both indoor and outdoor) involve direct interventions in nature. On the other hand, there is still a lack of knowledge about the impact these facilities have on health, environmental awareness, and travel.

In this chapter, we use a wide conceptualisation of the sports facility to include more than just traditional sport stadiums. Our definition of public spaces includes facilities such as "bowling alleys, health clubs, sportsplexes, park and recreation facilities and numerous other natural and man-made environments" (Fried

& Kastel, 2021, xi). To some extent, all sports facilities can be claimed to be more or less artificial. What was artificial yesterday is perceived as natural today. Therefore, it can be difficult to talk about “natural”, “original” or “authentic” facilities for sport. When *artificial sports facilities* are addressed in this chapter, we mean facilities where the basic condition for the activity, for example in the form of snow, ice, or grass, have been produced artificially. Previously, we have seen the global scale of this phenomenon in the spread of ice hockey arenas and more recently in the intensive growth of artificial turf surfaces for sports such as football, tennis, and baseball. To some extent, the prevalence of certain sports and artificial sports facilities is culturally connected to certain countries. For example, in Sweden, artificial cross-country ski tracks are very common, whereas artificial rapids for canoeing and kayaking do occur but are more common in other countries in Europe and the US. This links artificial sports facilities to their geographical and cultural origins. Even though an artificial ski tracks could be built in many places, they are linked to the historical background and long tradition of skiing in countries such as Austria, Norway, Sweden, and Switzerland. We will return to the context of sports facilities later in this chapter.

Another central concept in this chapter is *environmental sustainability*. In an effort to bring clarity to the discussion of this idea in relation to, for example, social and economic sustainability, Morelli (2011) defines environmental sustainability as “a condition of balance, resilience, and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity” (p. 5). We find that this definition is useful for further discussions of artificial landscapes from the perspective of environmental sustainability.

We will begin this chapter by problematising the meaning of an *artificial sports facility*. Thereafter, we will describe three theoretical concepts and models that are relevant to this topic. The first is Klas Sandell’s *eco-strategic framework* for landscape relations (Sandell, 2016). The second is Lars-Magnus Engström’s concepts for *meaning-making logic* within the sports and movement culture (Engström et al., 2018). The third is Brad Millington and Brian Wilson’s concept of *contextual sport* for discussing the geographical placement of sports in relation to environmental sustainability (Millington & Wilson, 2016). We will, in addition, use these theoretical models and concepts to discuss the state of knowledge regarding the relationship between artificial sports facilities and environmental sustainability more thoroughly. Finally, and in light of the current state of knowledge and the described theoretical models, potential future scenarios will be discussed.

What is a sports facility?

Throughout history, sports facilities have been associated with man-made buildings as well as with more or less constructed open areas. Before the turn of the nineteenth century, swimming facilities, halls for gymnastics, open fields for games, as well as

natural ice for skating were a common phenomenon in Sweden. After this period, the conventional idea of a sports facility as a constructed building began to spread. More halls for Ling gymnastics (internationally better known as Swedish gymnastics) were built as were a growing number of fields for combined football and track and field activities. Although some strong criticism of this early standardisation and indoorisation of physical activity and training was voiced, there was already in the Swedish gymnastics movement a desire to control and adapt the training landscape (Ljunggren, 1999; Svensson, 2022). After the Second World War, the construction of indoor halls increased as a consequence of the spread of various indoor rackets and other ball games (Blom & Lindroth, 1995). Still, many sports continued to be primarily conducted outdoors, in spaces where the level of adaptation was still fairly low. Football, swimming, skating, and bandy are good examples of this. However, the overall sportification process eventually started to affect these traditional outdoor sports as well. Arenas for bandy and ice hockey were gradually standardised and specialised, moving from frozen ponds and lakes via outdoor maintained rinks to indoor arenas. This was a more controversial process in bandy where its links to a Nordic tradition of outdoor sports slowed its move to an indoor location in comparison to ice hockey, which, as a “modern” North American import, was already a well-established indoor sport (T. Andersson, 2020).

Today, the increased differentiation of activities in competitive sport and spontaneous physical movement has opened up a wide and inclusive view of what defines a sports facility. According to the Swedish Sports Federation, a sports facility can be a “constructed or allotted area” which can include “free air, land and water” (Riksidrottsförbundet, 2015, p. 6). In this chapter, the concept of a sports facility will be taken to include man-made buildings as well as more or less constructed landscapes.

Artificial sports facilities: A new phenomenon?

When considering, for example, an indoor downhill ski slope or an indoor surfing centre, it is easy to understand artificial sports facilities as a modern phenomenon. However, seen from a historical perspective, there are many examples during the twentieth century of sports in which humans have adapted nature and landscapes to their needs. Cross-country ski tracks, downhill ski slopes with lifts, golf courses, football fields, ice hockey rinks, and swimming pools are just a few of these types of spaces. This process of adaptation has developed in parallel with the increased *sportification* of sports. This means that the practice of sports now follows more or less formalised and articulated contracts for how to perform, assess, and value sports, often in terms of quantified measures. As a consequence, sport has become more specialised, organised, and professionalised (Guttmann, 1978; Svensson & Sörlin, 2019; Yttergren, 1996). Seen from a historical perspective, increased sportification has been a driving force in the development of artificial sports facilities. There has been an overall trend towards increasing levels of adaptation, standardisation, and specialisation of sports facilities and training landscapes. From the

traditional mountaineering, games, and leisure of the nineteenth century, where the role of nature was strong (Fabian, 2021; Schut, 2016), to the outdoor sports of the first half of the twentieth century and to the artificial and even virtual training landscapes of today, the role of weather and geographical context, with all of its variety and uncertainty, has been controlled and limited in favour of predictable, reliable, and comparable conditions (e.g., Fouché, 2017; Svensson & Sörlin, 2019; van Bottenburg & Salome, 2010; Vertinsky & Bale, 2004).

Today, we see that the definition of what is or is not an artificial sports facility is being renegotiated. For example, a cross-country ski track is not what it was 30 years ago. The development of artificial snow and ski track-machines, the introduction of fees for ski tracks, as well as the possibility of saving snow (both artificial and natural) for the next skiing season have placed increasing demands on ski facilities, both from elite and amateur skiers. In Sweden, there are already several indoor facilities for cross-country skiing and more are being planned. This development of artificial ski tracks reflects the status of cross-country skiing in Sweden and its position as a carrier of cultural values in Swedish sport and in Swedish society in general. It also points to the growing urbanisation of sports landscapes, a process that sees sports facilities constructed in greater proximity to major cities and adapted for use in urban or suburban environments. Similar developments have been analysed in other European countries, for example, in France (Schut, 2017).

Another example of the changing human impact on the construction of the sporting environment is the canoe slalom. At the beginning of the twentieth century, competitions were held in white water rapids without any obstacles to negotiate. During the interwar period, gates were introduced as an extra challenge. Initially, these consisted of buoys or poles floating on or rising above the water's surface but for security reasons, these were later changed to hanging gates (Endicott, 2007). Today, all international canoe slalom competitions are conducted on artificial rapids where the water flow can be controlled. The Swedish town of Falun has recently become host to the only artificial canoe slalom course in Scandinavia (Falu Vildvattenpark, 2021). Even if canoe slalom is not a big sport in Sweden, artificial rapids are rather common in other European countries.

Probably, the most common example of the human impact on sporting artifice is the development of artificial turf to replace the natural grass surface used in many sports. Designed to imitate grass in both performance and appearance, it was first introduced in 1966 as the roof cover of the Houston Astrodome baseball stadium blocked out the natural light that is required for the growth of the natural grass field below. The new artificial surface was dubbed "astroturf"; the product was made of nylon and consisted of fibres sewn onto a backing mat. It became a success in the world of baseball and soon spread to other sports. In 1969, it was used for the first time by the NFL and soon spread to field hockey because of its superior playing characteristics. When compared to natural turf, artificial grass was found to improve ball roll, bounce, and predictability. In 1976, the hockey field stadium in Montreal was the first to use artificial turf at an Olympic Games.

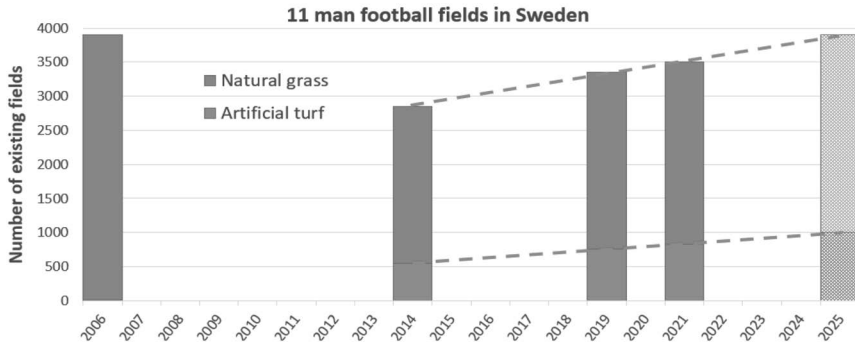


Figure 4.1 The number of 11 vs. 11 football fields in Sweden, excluding hybrid fields.

Source: Danielski (2021).

Artificial turf technology has improved steadily since the 1980s. By adding a shock pad to decrease surface hardness and sand infill to increase pile durability, sports performance improved significantly. When European football entered the scene in the early twenty-first century, and thus prompted the development of third-generation artificial turf, artificial turf technology quickly spread all over the world. In Sweden alone, about 830 new 11 vs. 11 and over 250 smaller football pitches with artificial turf were constructed between 2006 and 2021, a number that is expected to increase (see Figure 4.1). There are no exact global figures for the number of sports pitches with artificial turf, but it is estimated that there are more than 50,000 artificial pitches in Europe with a combined area of 112 km². There is an additional 24 km² in the US.

The developments illustrated by the sporting environments described above show that some outdoor sports that were previously performed in “natural” environments are now being played in facilities, both indoor and outdoor, because they are secure, predictable, and controllable (Salome et al., 2013; van Bottenburg & Salome, 2010). This chapter argues that artificial sports facilities are not a new phenomenon. They have multiplied in response to changes taking place in contemporary society (Sandell, 2011). We believe that labelling sports facilities as artificial or natural must be understood in relation to historical, social, cultural, and technological contexts.

Concepts and models

How can landscape relationships be influenced by the sporting environment?

In a discussion of artificial facilities for sport, outdoor recreation, and physical exercise, Sandell (2011, 2016) and Sandell and Öhman (2013) outlined an eco-strategic framework that could contribute to a deeper understanding of the relationship between humans and nature. Although Sandell’s framework

is primarily used in relation to outdoor recreation, we also find it useful as a way of understanding outdoor sports, especially since the performance of outdoor sports in artificial facilities is becoming more common. Sandell argues that there are two common approaches to nature in contemporary outdoor sport: the *active domination style* and the *active adaptation style*. The active domination style sees the landscape as a factory to be adjusted to the activity, for example downhill ski slopes, adventure landscapes, and climbing walls. The active adaptation style, however, views the activity as subordinate to the landscape with regard to weather and season, for example cross-country skiing in natural snow tracks. The active domination style means that the activity can be performed even though it is taken out of its context, a phenomenon Sandell (2011) calls the *de-contextualisation* of the activity.

Sandell suggests that these different approaches to nature and the landscape are important for understanding how human lifestyles are adapted to the environment. Using Sandell's framework, the artificial facilities, in focus in this chapter, can be seen as an example of the active domination style. Sandell's work suggests that it is unlikely that the active domination style will lead to care for the environment. Our ambition in this chapter is to elaborate on the unintentional environmental consequences that derive from artificial sports facilities. As of yet, there is a lack of knowledge of the potential social benefits that might come from artificial sports facilities, such as improved health, greater participation levels, and decreased travel costs.

How is the logic of sport compatible with the logic of perceiving nature?

A basic assumption within pedagogy is that humans acquire certain behaviours, habits, and lifestyles if they are found to be meaningful. With physical activity, for example, the reason a person might carry out this practice might be to compete, to get fit, to practice a skill, to play, conquer challenges, or experience nature. This is what Engström et al. (2018) refer to as *the logics of the movement culture*. According to Engström, when people move it can be because they, consciously or not, find one or several of these logics meaningful. The process of acquiring a logic is often the embodiment of childhood experiences. When sporting leaders and coaches encourage their adepts, for example, to “just go out there and enjoy yourselves” they can only to a certain extent influence the logics they hope will characterise an activity. Even though the logics of the movement culture are individually created, Engström argue they can be studied on a group level, and that people who find certain practices to be meaningful often gather in the same contexts, such as, in competitive sport (Engström et al., 2018).

In what way can ideas about the logics of the movement culture be relevant for understanding and explaining the relationship between sports facilities and environmental sustainability? According to Sandell, the landscapes with which we engage can either limit or enable our attention towards, and awareness of, the natural world that surrounds us. This attention and awareness can in turn

influence our execution (or not) of environmentally sustainable actions (Sandell, 2011, 2016; Sandell & Öhman, 2013). With Engström's and Sandell's ideas in mind, it is in the meeting between what individuals find meaningful and the environments for sport and movement (sometimes in the form of facilities) in which they engage, that we can find the potential for sport to contribute to wider questions about environmental sustainability. Recently, Backman and Svensson (2022) found that artificial sports facilities are adjusted so that they fulfil the criteria of standardisation, control, and the minimisation of risk within competitive sport. Furthermore, they emphasise that this adjustable design attracts some people more than others, usually those who find the logic of competition meaningful. The meeting between dominant movement logics of performance and competition, on either an individual or group level, and an artificial sports facility cannot be expected to result in either a thoughtful or a caring approach to nature.

Contextual sport – A radical proposal against artificial sport facilities?

There has been a discussion in recent times about the extent to which it is reasonable that all people should have access to all kinds of sports independent of location, climate, or context. Millington and Wilson (2016) introduced the concept of *contextual golf*, which means that in order for golf to be environmentally sustainable, it might be necessary to construct golf courses only in locations where their negative environmental impact can be minimised. For example, one crucial factor in the construction of golf courses is access to water, suggesting that for golf courses to be environmentally sustainable, they perhaps ought not to be built in desert areas, where water is scarce. Given the discussion about the environmental sustainability of artificial sports facilities, this idea of contextual golf could be expanded to *contextual sport*. Environmental considerations would then trump the drive for predictable, controllable, and optimised sporting conditions. If sport is to be contextual, indoor facilities for cross-country skiing and downhill skiing cannot easily be justified and the construction of golf courses or canoe slalom courses without access to natural water becomes highly problematic. To some extent, *contextual sport* implies a return to historical sporting conditions, when many sports emerged in response to local, regional, and national geographic conditions. Skiing became popular where there was snow, surfing where there were waves, and climbing where there were mountains. A less romantic, but perhaps more accommodationist interpretation of *contextual sport* would be to conduct sports only in places where not too much harm can be done to the environment. The question following this framing of *contextual sport* is how to define *too much harm* with regard to the construction of artificial sport facilities. The idea of *context-dependent sports*, sports which aim for an equitable balance between the respective demands of competition and environment could then be closely linked to the United Nations Sustainable Development Goals, thus activating a relationship between sports facilities and training landscapes on the one hand and the environment on the other.

Research on environmental sustainability and sport facilities

There is no doubt that the construction of sports facilities comes with environmental stress. International research has pointed out that negative environmental impacts in the form of pollution, water consumption, electricity usage, and waste management are difficult to avoid and that it is of the utmost importance that ecological considerations are taken into account in facility planning and construction processes (Grant, 2014; McLeod & Holden, 2017). We will now turn to the case of football, which will be analysed from various perspectives in relation to its environmental impact.

Technical and material aspects

Studies that consider the whole life cycle of artificial turf used in football fields have shown that third-generation artificial turf technology may use more energy resources and emit more GHG emissions in comparison to a similar-sized field with natural grass. Given artificial turf's higher utilisation rates, per activity time it may in fact have the opposite results, especially in cold climates. (Cheng et al., 2014; Itten et al., 2021). The environmental effects of artificial turf can vary considerably depending on technology, location, and level of maintenance.

Most of the current third-generation artificial turf systems in use today are made of fossil-based plastics. These are divided into three primary components: backing, infill, and grass. The carpet backing is made of a blend of polypropylene, polyamide 6, polyolefins, and/or polyurethane. The most common infill materials are made from styrene butadiene rubber (SBR), ethylene propylene diene monomer (EPDM) and thermoplastic elastomer (TPE). Bio-based materials are also used, but only in limited amounts. Plastic infills are usually placed on top of a sand infill layer. The purpose of the sand is to weigh down the carpet and keep the pile vertically oriented. The artificial grass fibres are made of polyethylene (PE) or polyethylene (PE)/polypropylene (PP) which is intended to provide a feeling of natural grass. In total, a full-sized 11 vs. 11 football fields with third-generation artificial turf may include more than 100 tonnes of fossil-based plastics (Bø et al., 2020).

Maintaining artificial turf for sports activity can be an intensive task involving personnel time and the use of special machinery. First, the whole artificial turf surface needs to be replaced every ten years or every five years, if used for professional football. The infill needs to be regularly replenished because of compaction and loss. Artificial turf also requires the extensive use of surface brushing machinery to ensure uniformity of the infill, prevent its compaction, remove debris, and replenish it when necessary. Removal of the moss, algae, and weeds which can often grow on the surface may also require the use of chemicals. Artificial turf requires irrigation. During a single match, as much as 21 m³ of fresh water is needed to reduce the turf's surface friction, improve play quality, and reduce the

risk of burn injuries by keeping the turf at an acceptable temperature. Still, the use of freshwater may be lower in comparison to natural grass pitches, especially in warm climates.

In cold climates like Sweden, extending the playing season of artificial turf fields into the winter months can add additional maintenance work due to snow-fall. Removing the thousands of cubic metres of snow required to maintain artificial fields after the winter months involves the significant use of machinery. Snow removal is also considered the main cause of the spreading of microplastic (Anderson et al., 2016; Bø et al., 2020). Some football fields are equipped with under-soil heating so the surface is kept frost-free. Such technology reduces the amount of snow to be removed, but at the cost of energy use. Such a field can use heat energy in the range of a few GWh annually. The production process of such an amount of energy contributes to hundreds of tonnes of CO₂e that are emitted as GHG into the atmosphere (Danielski, 2021). An additional cause for the spreading of microplastic to nature is the players themselves because the infill materials attach to their clothes and shoes and carry them out from the field. The maintenance work involved and the use of materials both contribute to the negative environmental impacts over the life span of an artificial turf field, as discussed above.

When comparing the environmental impact that the spread of artificial turfs during the last decades (see [Figure 4.1](#)) can have to a relatively new phenomenon, like the construction of artificial water rapids for canoe slalom, it is possible to see that artificial facilities for outdoor sports are to a large extent historically and culturally dependent phenomena. Today, artificial turf is almost considered the “new normal”, something that is not yet the case for artificial water rapids. Although artificial turfs have a considerable environmental impact, they are seldom problematised as an example of an *active domination style* (Sandell, 2016; Sandell & Öhman, 2013), nor is there much discussion around whether or not these environmental consequences are a price for playing sports that is too high to pay (Millington & Wilson, 2016). While a football pitch has a long tradition of being understood as artificial, in the sense that it has long been a constructed and delimited space, the shift from non-standardised natural grass fields to highly standardised arenas with artificial turf has shifted the environmental impact of playing the game, as well as the game itself (H. Andersson et al., 2008).

The work in sport federations

Even though environmental work in relation to sport facilities is an area under development, there are several good examples that can already be highlighted. The National Hockey League (NHL) regularly publishes a sustainability report in which the measurable results of rink energy and water consumption, as well as the League’s management of waste, are presented (NHL, 2018). The German football league Bundesliga is currently working on a sustainability index where club

carbon dioxide emissions during matchdays are listed and compared (Bundesliga, 2021). In Sweden, several sport federations are working with environmental sustainability. For many, this has been limited to a general policy description of their environmental commitments, but some federations have gone a step further and have described their actions in a more concrete manner, partly in relation to their facilities.

For example, the Swedish Football Association supports football clubs who want to make their turf environmentally secure by helping them to implement the design guidelines for reducing the spread of microplastics, such as those provided by the European Committee for Standardization (SIST-TP CEN, 2020). The guidelines include recommendations for field design, snow storage compounds, the cleaning of maintenance machinery, and the use of brushing stations for clothes and shoes, among others. In addition, they offer financial support to clubs that would like to make their facilities more energy efficient (Svensk Fotboll, 2021). Two other sports federations that have taken steps to measure their energy and water consumption and waste management levels are the Swedish Ski Federation and the Swedish Automobile Sports Federation (Svensk Bilsport, 2019; Svenska Skidförbundet, 2021).

The work in clubs, networks and communities

There are both top-down and bottom-up approaches currently underway that seek to promote sustainability within contemporary sport. Initiatives to build better facilities, coordinate, and collaborate on change efforts can be seen across Europe and in Sweden. For example, in football, a *top-down approach* through guidelines and regulations have been used to govern clubs and organisations to include environmental sustainability into their work.

In Sweden, a unique network was established in 2017 to collaborate on reducing the environmental and health impact of artificial turf and similar surfaces, with a focus on the problem of emissions and the spread of microplastics. Financed by the Swedish Environmental Protection Agency (Naturvårdsverket) and bringing together representatives from 30 different municipalities, real estate companies, sport facilities, football associations, and local clubs, the network conducts various types of feasibility studies, investigations, and tests to increase knowledge about the environmental impact of artificial turf and how it can be minimised (Beställargruppen för Konstgräs, n.d.).

The Green Sports Alliance is an international trade organisation that seeks to raise awareness of environmental issues in sports and to encourage stakeholders to promote healthy and sustainable sports communities. They are dedicated to creating meaningful change towards a more sustainable future. The alliance has members in both industries and across a range of sporting bodies, such as academies, leagues, clubs, and stadiums. Together with other stakeholders, the Alliance encourages collaboration as a way of promoting behavioural change and raising awareness of what is environmentally possible in sports.

Enhancing sustainable development in sports organisations can also follow a *bottom-up approach*, where the focus is on sports clubs themselves to work actively with environmental issues. According to Robertson et al. (2019), the primary goal of a sports club is to deliver a sporting experience that provides opportunities for people to practice sports and maximise participation while remaining financially viable.

The new carbon-neutral football stadium recently constructed by the German FC Freiburg has been put forward as an example of how football clubs and communities can collaborate around the building of an environmentally sustainable sport facility. Part of the recipe for its success has been described as its consideration of human needs combined with its sensitivity to nature, the surrounding patterns of bird and animal movements and its effect on local air quality and sound levels. The aim has been to achieve the label *stadium sustainable*, a concept that demands that the ecological, social, and economic interests of all affected species (human and non-human) must be reconciled in a sporting arena's construction process (Bunds et al., 2019).

In Sweden, all major football clubs accept that promoting integration and inclusiveness are part of their social responsibility and they work actively to provide clear information about their efforts in this direction on their websites. As many as one in ten Swedes is a member of a football club, that in turn have membership in the Swedish Football Association. As the national coordinating body for football in Sweden, the Swedish FA is a powerful force with a large audience it could impact with a positive environmental message. However, environmental responsibility is not mentioned on any of these clubs' websites. A recent study showed that none currently have an environmental coordinator or any environmental programs or goals and player knowledge about the environmental effects of football facilities seems to be low (Danielski, 2021). In another Swedish study that aimed to identify what individual athletes in cross-country skiing and canoe slalom perceive as meaningful logics when practicing sports in artificial landscapes, Backman and Svensson (2022) found that sport practitioners who train in artificial landscapes demonstrate the dominant logic of performance at the expense of alternative logics, such as nature experience or environmental sustainability.

Existing research makes it possible to draw some conclusions about what is experienced as meaningful within sporting organisations, clubs, and communities, particularly with regard to their interactions with sports facilities. The research appears to show that if the logics of preserving environmental resources and experiencing natural surroundings are to be experienced as meaningful (Engström et al., 2018) and are expected to play a decisive role for decision-makers as well as for practitioners, *top-down* regulations and changes will not always be the most effective approach. Instead, we argue that *bottom-up* initiatives, that build on the idea that people will start to make the environment a priority if they find it meaningful, will likely be a much more powerful force for change.

The effects of the Covid-19 pandemic

Recently, a few studies have been conducted in Sweden that have focused on how sport and outdoor areas were affected during the Covid-19 pandemic. Skriver Hansen et al. (2021) have shown that many Swedes took on new outdoor habits during the Covid-19 pandemic and that nature was experienced as a safe place to be. However, these new outdoor habits came with a price. Increased visitor numbers at popular outdoor areas and national parks increased the human impact on them. Outdoor areas that were already popular became even more so while more experienced outdoor practitioners moved into less frequently visited areas. In another study, Armbrrecht et al. (2021) discovered that during the pandemic, sport clubs prioritised economic sustainability before all else. Environmental sustainability was last on their list of priorities, falling below their concerns for social sustainability. This study also showed that one potential positive outcome following on from the Covid-19 pandemic could be that the sports movement will reduce the quantity of travel and use their facilities in more effective and climate-friendly ways in the future.

Is there an environmental potential in artificial sport facilities?

The overall picture that emerges from the combination of Sandell's eco-strategic framework, Engström's meaning-making logics, and Millington and Wilson's concept of the ecological relevance of the geographic locations of different sports, is that there is a viable theoretical critique of the environmental impact of artificial sports facilities. The critique lies partly in the construction of the facilities themselves and partly in the meanings these facilities create for the people who use them.

The critique against artificial sports facilities can be viewed from both a commercial and a socio-economic perspective. For example, Salome et al. (2013) have shown that cost savings and improving market image and reputation could be prominent drivers for the "greening" of the companies responsible for artificial sports settings. The political perspective is yet another important angle. Is it possible that political pressure might come to bear in the building (or not) of these facilities? For example, the widespread popularity of football gives football culture a strong political voice in society. Their demands relating to football facilities can carry great weight in local politics. One common demand by football clubs is the construction of additional artificial turf fields that can be played on even during the winter season when natural grass pitches are not usable. Municipal decision-makers often find themselves trapped between cultural and environmental politics, or as Danielski (2021) describes them, "pawns in the political game". Further research needs to be conducted to determine who benefits from these facilities and in whose interest they are built. This becomes especially pertinent when socio-economic arguments are included and when the money and attention that specialised artificial sports landscapes and facilities require are compared to

other areas where training and physical activity can be conducted. The pandemic highlighted how the use of specific sport facilities can change quickly, and not always in the most predictable ways (Book et al., 2022).

One perspective that has not been present in the discussion so far or in the research conducted to date is the potential positive consequences that might follow on from artificial sports facilities. Despite the lack of research, there is reason to assume that the increasing accessibility that artificial sports facilities provide might be the health benefits they offer for a greater range of individuals. Sandell (2007) also suggests that an artificial sports facility has the potential to be exiting and attractive, not least for young people. Perhaps new groups can be targeted? Perhaps activities in artificial sports facilities can encourage an interest in practicing sports in outdoor environments? It is still not yet established how many of the people who use artificial sports facilities would seek other options if the artificial facilities were not available or what a lack of facilities might mean for the extent of sport-related travelling. Perhaps it is possible to be uninterested in nature and still desire your sport to be environmentally sustainable? A problematisation of Sandell's (2016) and Sandell and Öhman's (2013) thesis that an active domination style is built into artificial sports facilities would be to raise the question of whether or not it is better for the environment to have a few large outdoor sport centres where many people can gather compared to many smaller outdoor centres with fewer visitors. These are just some of the issues that would need further investigation before well informed and ecologically justified decisions could be made about the construction of any future sports facilities. From what we know today, the active domination style as well as the ambition in sport to design all facilities according to certain prescriptive standards needs to be challenged. Future sports facilities, both artificial and authentic, will need to stimulate more logics than competition and physical achievement if sport and outdoor recreation is to be environmentally sustainable. The process of sportification, which has prioritised the growth of sport economies and encouraged ever higher performance levels, would need to shift its focus to incorporate environmental concerns. This would imply a development of the concept of *contextual sport*, in which sport must learn to exist in harmony with the political priorities and environmental context in which we find ourselves today. Sports are no longer context-dependent on only a local or regional scale. They are also part of a global society in which environmental questions can no longer be disregarded.

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